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ELECTRONIC SYSTEM Of IDENTIFICATION
Of a PLURALITY OF TRANSPONDERS

The present invention is relative with a system of electronic identification without contact or system RFID. These systems, typically used for the identification of people, animals or goods (amongst other things examples: vehicles, articles requiring a marking, subsets in a production line, etc), comprise mainly interrogative/reader and one or more transponders associated each one with an article in front of tre identified.

In such a system, interrogative I'/reader is typically arranged to emit a signal of interrogation in the form of an electromagnetic radiation. The transponders subjected to this electromagnetic field of interrogation answer by the generation of a signal of answer comprising normally in a modulation of this field, and providing a code/address generally identifying the transponder.

In any system of identification comprising a plurality of transponders, there is potentially a risk that two or several transponders questioned generate simultaneously their signal of answer, thus making their identification impossible. So so as to identify each transponder individually and clearly, it is required to envisage a communications protocol, or " protocol anti-collision ", making it possible to manage this type of conflicts effectively. These problems were addressed various manners in the former art.

Thus European patent EP 0494 114 described such a system of identification where each transponder is adapt to repeat the emission of its signal of answer in order to increase the probability of a successful reception of this one by the interrogative one. The times generated between each emission of the signal of answer are substantially longer than the duration of the signal of answer so as to allow the identification of a large number of transponders. A temporary signal of inhibition moreover is transmitted to each transponder correctly identified so as to draw aside this one of the process of identification and to thus decrease the interferences with the other transponders.

The solution described in this European patent EP 0494 114 particularly proves adapt with the recognition of multiple transponders but it revte however less effective in terms of time of transaction for low quantities of transponders. By " time of transaction " one understands global time required with the completion of the process of communication carried out, for example the identification of each questioned transponder. Moreover, owing to the fact that the signals of answer are transmitted with intervals of random times, i.e. of nonsynchronous manner the ones compared to other, it is required that the interrogative one/reader synchronizes themselves on each received signal of answer.

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Other processes of identification are based on the development of a tree by systematically questioning each transponder according to its single identifying code. In the US patent 5,489,908, for example, it is thus proposed to carry out the emission of a signal of interrogation including/understanding a sequence of bits intended for tre compared by each transponder with the least significant bits of the single identifying code stored in its memory. The transponders whose identifying codes do not include/understand this sequence of bits thus suspend the emission of their signal of answer. The sequence of bits is then adapt until a single transponder answers the interrogation.

This process of identification is effective, because systematic, but revte obviously also large consumer in time terms of transaction. II is also manifest that two transponders possessing of the identical identifying codes cannot tre identified separately.

The US patent 5,539,394 described a system of identification presenting an architecture of division and temporal multiplexing. In this patent, the signal of interrogation is thus used to generate the opening of a whole of fentres of answer on which the reader and the different questioned transponders are synchronized. An algorithm of distribution is used by each transponder in order to determine the fentre answer during which it will emit its signal of answer. For this making, I' algorithm of distribution base on a parameter of distribution (equivalent with the number of fentres of answer) like on information feature of each transponder, i.e. its single identifying code and/or very other information stored in its memory.

On reception of an emanating signal of answer of a single transponder, the reader emits moreover a temporary signal of inhibition
drawing aside the identified transponder of the continuation of the operations. A collision
appears if several transponders emit their signal of answer during
Mrs. fentre of answer. So the cycle of interrogation is re-initialized
on base of a new parameter of distribution, resulting in a different allowance of the fentres of answer. This process is thus repeated until each transponder is individually identified.

In an embodiment presented in this US patent 5,539,394, I' algorithm of distribution consists in dividing the identifying code of the transponder by a divider (the parameter of distribution) so as to produce a corresponding remainder with the fentre of answer in which the transponder will emit its signal of answer. The parameter of

distribution used as dividing is equivalent to the number of fentres of answer used. II follows itself from there that it is thus not possible to individually identify transponders whose identifying code is identical, because those will select Mrs. fentre invariably answer some is the parameter of distribution used.

Moreover, in terms of times of transaction, single the fentres of answer during which a single signal of answer is transmitted are used of optimum manner. The fentres during which no signal of answer is transmitted, or during which a collision appears, generate waiting which lengthens the total time of transaction in substantial proportions. II proves indeed that the total time of transaction constitutes a critical element when one seeks to identify a whole of transponders within the most short possible times.

A first purpose of the present invention is thus to propose a system of identification making it possible to manage the linked problems with the identification of multiple transponders having potentially identical identifying codes.

A second purpose of the present invention is to propose a system of identification whose time of transaction required to the identification of the transponders is optimized as well as possible.

To answer the first aforementioned purpose in particular, the present invention has for first object a process of identification of a plurality of transponders being in a defined volume of communication by an electromagnetic field emanating from an unit of reading, the process including/understanding the following steps:
a) emission of the aforesaid electromagnetic field allowing the carrying in awakening of the aforesaid transponders being in the aforementioned volume of communication;
b) emission by the aforementioned unit of reading of a signal of interrogation allowing synchronization of the aforesaid transponders and initializing the opening of an emanating whole of fentres of answer intended for the reception of signals of answer of the aforesaid transponders, each one of the aforesaid transponders including/understanding of the means to select a fentre answer, among the aforementioned whole of fentres of answer, lasting which this transponder emits its signal of answer then;
c) sequential monitoring of the fentres of answer in order to determine the receptions without collision of signals of answer;
d) emission of signals of inhibition allowing the suspension, at least temporarily, of the activity of transponders whose the aforementioned respective signals of answer are received without collision; and
e) repetition of the steps b) with D) until the signals of response of the aforesaid the plurality of transponders are detected without collision at the time of the step c),
this process of identification being characterized in that the aforementioned means to select a fentre answer include/understand means of random selection which, with each new signal of interrogation, determine random manner a fentre of unspecified answer among the aforementioned whole of fentres of answer.

II results from these features that the process of identification allows a reduction of the emanating rate of collision between the different identification messages of the questioned transponders.

Indeed, a benefit of the present invention is to make it possible each transponder to choose by chance a fentre answer among an ordered whole of fentres of answer. The probability of collision is thus dependent number of fentres of allocated answers and number of questioned transponders and either of the information contained in each transponder as this is the case in the US document 5,539,394 city in you exposed of I' quoted former art.

To answer precisely the second purpose of the invention, the present invention has for second object a process of identification of a plurality of transponders being in a defined volume of communication by an electromagnetic field emanating from an unit of reading, the process including/understanding the following steps:
a) emission of the aforesaid electromagnetic field allowing the carrying in awakening of the aforesaid transponders being in the aforementioned volume of communication;
b) emission by the aforementioned unit of reading of a signal of interrogation allowing synchronization of the aforesaid transponders and initializing the opening of an emanating whole of fentres of answer intended for the reception of signals of answer of the aforesaid transponders, each one of the aforesaid transponders including/understanding of the means to select a fentre answer, among the aforementioned whole of the fentres of answer, lasting which this transponder emits its signal of answer then;
c) sequential monitoring of the fentres of answer in order to determine the states of occupation of them, especially a non-utilization or a reception without collision of a signal of answer;
d) emission of a signal of inhibition allowing the suspension, at least temporarily, of the activity of a transponder whose the aforementioned signal of answer is received without collision;
e) repetition of the steps b) with D) until the signals of response of the aforesaid the plurality of transponders are detected without collision at the time of the step c),
this process of identification being characterized in that the global time of transaction required to the identification of each one of the aforesaid transponders is optimized by unused means of reduction in the duration of fentres of answer.

II results from these features that the process of identification allows an optimization of the time of transaction global required the identification of the transponders.

Indeed, a benefit of the present invention is to make it possible to reduce the time of transaction into decreasing the duration of a fentre of answer not used, allowing of this fact a very substantial profit of time.

According to a mode of carrying in work particular, the process according to the invention moreover is arranged to decrease the duration of a fentre of answer during which a collision of several identification messages is detected.

Other features and benefits of the invention will appear during the description which will follow, given only as example and made while referring to the annexed drawings on which:
it present figure 1 schematically the principle of interrogation of a plurality of transponders subjected to the electromagnetic field of interrogation emanating from the unit of reading;
it figure 2 watch a diagram block simplified of an unit of reading according to the invention;
appear it 3a watch a diagram block simplified of a transponder according to the invention;

appear it 3b present a diagram block simplified of means allowing the random selection of a fentre of answer according to the invention;
it figure 4 illustrates the principle of allowance of the fentres of answer according to the present invention;
them figures 5 and 6 are flow charts describing the course of the operations from the point of view of the unit of reading and the transponder respectively for an embodiment prefered of the invention;
them figures 7a and 7b present a possible scenario illustrating the embodiment exposed on figures 5 and 6, where four transponders are questioned by the unit of reading.

Present figure 1 schematically the principle of interrogation of several TRj transponders subjected to an electromagnetic field 1 transmitted by an unit of reading 20. The electromagnetic field 1 defines a volume of communication 2 in which are included the TRi transponders. The volume of communication 2 represents the zone in which the TRi transponders can collect a substantial portion of the electromagnetic field 1 enabling them to take up duty. The TRj transponders are thus put in awakening under faction of the electromagnetic field 1. The TRj transponders being with you outer volume of communication 2 are not activated and do not take part of this fact not in the dialogue with the unit of reading 20.

Generally, you unit of reading 20 with the possibility of typically questioning the Tri transponders put in awakening by emitting a signal of interrogation INT comprising in a modulation of the electromagnetic field 1. This signal of interrogation INT indicates to the TRi transponders that the unit of reading 20 wishes to receive a signal of REPj answer including/understanding required information, typically an identifying code of the transponder.

According to the present invention, the signal of interrogation INT comprises in particular a sequence allowing the synchronization of all questioned the TRi transponders. According to an embodiment particular of the present invention, it is considered that the signal of interrogation INT includes/understands a code stock also, i.e. a sequence common to a family of transponders, for example a portion of their identifying codes, so as to thus allow a preliminary sorting of the transponders put in awakening.

This can prove particularly useful in order to restrict the communication with a particular family of transponders, for example a family of keys allowing the opening of a vehicle, or a whole of articles belonging to a defined class of products.

Present figure 2 a diagram block simplified of an unit of reading 20 according to the present invention. This one thus typically comprises means of Tx emission and reception X-ray respectively allowing remission of the signal of interrogation INT and the reception of the signals of answer REPI emanating from the questioned TRj transponders. Means of modulation 206 and demodulation 208 respectively allow the encoding of the transmitted signals and the decoding of the received signals. The unit of reading 20 includes/understands moreover means of treatment 202 manager the unfolding of the process of communication, these means of treatments 202 being coupled with means of storage 204, typically a reprogrammable memory (for example a EEPROM), allowing the storage of the received information of the transponders TRi or very other information required the course of the process of communication.

The present figure 3a a diagram block simplified of a Tri transponder according to the present invention. This one typically comprises a resonant circuit 300 formed inductance and of a capacity (not represented on the figure) connected into parallel. A modulator 306 allows the encoding of information to be transmitted, for example the identifying code of the transponder, by commutation of load of the resonant circuit 300. Modulator 306 is ordered by logical of control 302 coupled to means of storage 304. These means of storage 304, typically a EEPROM (or other types of reprogrammable memories), contain a code/address of the transponder and/or very other information recorded with manufacture or subsequently.

The TRj transponder comprises moreover means of extraction of clock 312 providing to logical of control 302 a clock signal CLK derived from the frequency of the electromagnetic field 1 transmitted by the unit of reading 20. The *encoding of information is thus carried out of synchronous manner for each transponder.*

The TRj transponder preferably comprises moreover means of detection 314, typically monostable, allowing the detection of short interruptions of the electromagnetic field 1. These means of detection 314 allow, in particular, the detection of interruptions of the electromagnetic field 1 generated by the unit of reading 20 and intended to transmit to the TRj transponder an order notifying to him to modify its state of communication, for example indicating to him to suspend its activity.

One will also prefer to use transponders of the passive type, i.e. transponders whose I' food is extracted from the ambient electromagnetic field, in the occurrence the electromagnetic field 1 transmitted by the unit of reading 20. For this making, energy required with the operation of the TRi transponder is extracted from the electromagnetic field 1 by the means of the resonant circuit 300 then is rectified by a rectifier 308. A circuit of initialization 310 makes it possible to initialize the logical one of control 302 when I' food is sufficient to guarantee the good operational operation of the transponder. II is to be noted that the use of transponders of the passive type is not essential with the present invention, of the transponders of the active type easily being able y tre substituted.

While referring now to the figures 3b and 4, one will describe hereafter the general principle of operation of the system of identification according to the present invention and particularly the random principle of selection of a fentre of answer. Thus, in accordance with what is schematized in figure 4, following the emission of the signal of interrogation INT by the unit of reading 20, a whole of N fentres SLOTk (k=1 with N) is generated. Each TRj transponder includes/understands means to select, according to a random process, a fentre of particular answer among 1 ' whole of N fentres of available SLOTk answers during which it will emit its signal of REPi answer.

The process of selection random of a fentre of answer is described hereafter more in detail while referring to the figure 3b. This present figure a diagram block simplified of an example of means allowing the random selection of a fentre of answer. Each TRi transponder thus preferably comprises an oscillator RC 402 delivering a signal clock RND CLK to a meter 404. This arrangement comprises moreover one logical of loading 400 making it possible to charge the instantaneous value of meter 404 in a register 406, the value thus charged in register 406 being representative of the number of the fentre of answer in which the transponder will emit its signal of answer as that is explained

ciaprès.

Oscillator RC 402 comprises elements of low tolerance and large sensitivity to the temperature and the operating conditions. These features lead thus to large disparities between the oscillators RC 402 of each Tri transponder. These divergences result moreover in a large diversity of the supplied values to outputted of meter 404 for each transponder.

II is to be noted that one will also prefer to choose oscillators RC 402 delivering a clock signal RND CLK whose frequency is substantially higher than the frequency of the clock signal CLK extracted the electromagnetic field 1, this so as to accentuate the divergences between the values representative of the number of the fentre of answer generated by meter 404 of each TRi transponder.

As of the carrying in awakening of the transponder, oscillator RC 402 delivers the clock signal thus RND CLK, incrementing meter 404. On reception of the signal of interrogation INT, the logical one of loading 400 carries out then the loading of the instantaneous value of the meter in register 406. II is to be noted that meter 404 generates values continuously as long as the transponder is in awakening and whatever the operations in the course of execution. The order of transmitted loading by the logical one of loading 404 thus makes it possible to solidify in register 406 the instantaneous value of meter 404.

It will be noted that the process of selection random of a fentre of answer does not make it possible to be been free totally from the problem of collision. II will be thus required to re-execute a new cycle of interrogation if a dispute between several signals of REPj answer appears. So the total time of transaction required to the identification of all questioned the TRi transponders will depend on the total number of cycles of interrogation carried out.

According to a second appearance of the invention, the process of identification is preferably arranged to allow the optimization of the global time of transaction required the identification of each transponder by managing the occupation of the fentres of answer SLOTk (k=1 with N). Three cases of figure can indeed arise during a fentre answer. The first case of figure is characterized by a transmission without collision of a signal of answer REFERENCE MARK during the fentre of answer. In this case of figure, the transponder emitting the signal of answer can tre thus identified individually. This transponder is then typically inhibited of temporary manner in order to draw aside you from a subsequent cycle of interrogation. According to an embodiment of the present invention, the unit of reading 20 emits a MUTATED signal of inhibition thus allowing the suspension of the activity of the transponders whose respective signals of answer are received without collision.

The second case of figure is characterized by the absence of transmission of a signal of answer REFERENCE MARK during the fentre of answer. An important profit in term of time of transaction can tre thus realized by the reduction in the duration of the fentres of unused answers. II is indeed possible to determine, already after a certain period of the fentre of answer, if this one is used or not. According to an embodiment of the invention, the global time of transaction required the identification of each transponder is thus optimized by means of reduction in the duration of the unused fentres of answer.

The third case of figure which can arise is characterized by a simultaneous transmission of two or several signals of response during the fentre of answer. In this case of figure, it is also possible to determine, already after a certain period of the fentre of answer, if a collision appears because the given ones in the course of reception by the unit of reading are deteriorated by the superposition of several signals of answer. According to an embodiment of the present invention, the time of transaction required to the identification of each transponder is thus also optimized by means of reduction in the duration of the fentres of response during which a collision is detected.

An example of realization of the means of reduction in the duration of the fentres of response for the cases of figure presented above will be described more in detail in the continuation of description by referring to figures 5 to 7. II is moreover important to note that the optimization of the time of transaction as presented in present description is applicable that! that is the adopted principle of selection (random or deterministic) of the fentres of answer.

Present figure 5 a flow chart describing the course of the operations carried out by the unit of reading 20 for an embodiment prefered. The communications protocol thus begin with you emission from the electromagnetic field 1, represented by block 500. The cycle of interrogation is initialized with block 502 by the transmission of the signal of interrogation INT. This signal allows the synchronization of the transponders questioned on the unit of reading 20 and launches the process of selection random of a fentre of answer.

As that is schematized with block 504, it is first of all checked if the cycle of interrogation came to a end. In the affirmative one, you unit of reading 20 proceeds to the block of decision 518 as we will return ciaprès there. In the negative one, I' unit of reading 20 scans the fentre then answer SLOT in progress in order to check the state of occupation of it. During this operation, represented with block 506, you unit of reading 20 tests if a signal of answer REFERENCE MARK is received after a certain period of the fentre of current answer. If such is the case, i.e. if a positive answer is supplied with outputted of the block of decision 508, the process continues its course. In the opposite case, you unit of reading 20 generates a signal of jump of fentre SHIFT, this signal of jump of fentre SHIFT indicating to all the transponders in activity the passage to the fentre of following answer SLOT. This Mrs. operation, represented with block 512, is carried out if a collision is detected, this thus resulting in a positive response to outputted of the block of decision 510 indicating of the collisions. In this case of figure, an indicator specifying that a collision appeared during the cycle of interrogation is activated with block 511 front the emission of the signal of jump of fentre SHIFT. If no collision is detected with block 510, the process continues its course like indicated.

On reception without collisions of a signal of answer, the information transmitted by the questioned transponder, typically its identifying code, is memorized with block 514 in the memory of the unit of reading 20. This information thus stored will allow the unit reading 20 to address the transponder concerned subsequently. With block 516, you unit of reading 20 generates, in complement, a MUTATED signal of inhibition indicating to the transponder concerned that it was identified and that it can, at least temporarily, to suspend its activity. Following the emission of the MUTATED signal of inhibition, a signal of jump of fentre SHIFT is also transmitted in order to indicate the passage to the fentre following answer SLOT.

Each fentre of answer is thus scanned according to unfolding presented above, until the block of decision 504 indicates that the cycle of interrogation is finished. If a collision were detected at the time of the one of the fentre of answer, in other terms, if the indicator of collision were activated with block 511, it will be required to undertake a new cycle of interrogation. The cycle of interrogation is thus repeated until the moment when the block of decision 518 does not indicate any more any collision.

With fine of the communications protocol, with block 520, it is then possible to address each transponder identified individually on the basis of the information memorized to block 514.

While referring on figure 6, one will now describe the course of the operations from the point of view of a transponder TR for the embodiment prefered describes higher in reference on figure 5. The transponder is put in awakening, with block 600, under faction of the electromagnetic field 1 transmitted by the unit of reading 20. The emission of the signal of interrogation INT is then collected by the transponder with block 602. This signal of interrogation INT defines a temporal reference compared to which the transponder is synchronized.

The random process of selection of the fentre of answer SLOT is represented with the following block 604. As described previously, this selection consists in determining a number of fentre of answer SLOT during which the transponder will transmit its signal of answer REFERENCE MARK.

Thereafter, as this is indicated with block 606, transponder TR awaits the occurrence of the fentre of selected answer SLOT. For this making, transponder TR counts the signals of jump of fentre SHIFT transmitted by the unit of reading 20 during this period until the occurrence of the fentre of selected answer SLOT. These operations its are put in awakening under faction of the electromagnetic field 1 transmitted by the unit of reading 20. Following the generation of the signal of interrogation INT, the unit of reading 20 opens a whole of N fentres temporal of SLOTk answer, in the present case 8 fentres of response referred SLOT1 to SLOTg were represented as example. Each transponder TRj (i=1,2,3,4) chooses a fentre by chance answer during which it emits its signal of answer REPj (I=1,2,3,4). In the example presented in the figures 7a and 7b, one thus illustrated the situation where transponders TR1, TR2, TR3 and TR4 respectively chose the fentres answer SLOT4, SLOT7, SLOT2 and
SLOT4. One notes as well as the signals of answer REP1 and REP4 of transponders TR1 and TR4 enter in collision during the fentre of answer
SLOT4.

The fentres of answers SLOT1, SLOT3, SLOTs, SLOT6 and SLOTg being used per any the Tri transponders (I=1,2,3,4), a signal of jump of fentre SHIFT is thus generated after a certain period of the fentre of answer. A signal of jump of fentre SHIFT is also generated during the fentre of answer SLOT4 following the collision between the signals of answer
REP1 and REP4 of transponders TR1 and TR4 respectively, this signal of jump of fentre SHIFT being interpreted by transponders TR1 and TR4 so that they suspend the emission of the signals of answer REP1 and REP4.

A MUTATED signal of inhibition is transmitted with meeting of transponders TR2 and TR3 for which the reception could tre carried out without collisions. Transponders TR2 and TR3 are thus temporarily isolated of the population of the questioned transponders. This MUTATED signal of inhibition is followed of a signal of jump of fentre SHIFT in order to indicate the passage to the fentre following answer.

A second cycle of interrogation (not represented) owes tre re-executed so as to recognize two transponders TR1 and remaining TR4. One will include/understand as well as the probability that a collision appears again at the time of the cycle of interrogation following is low.

The figure 7b illustrates the scenario described above in the shape of temporal diagrams where the signals of REPj answer emanating from each transponder TRj (I=1,2,3,4) are respectively represented schematically, as well as the transmitted signals MUTATED and SHIFT by the unit of reading 20. This figure makes it possible moreover to note that the duration of the fentres of answer during which no signal of answer is transmitted, or during which a collision is detected is reduced by the emission of the signals of jump of fentre SHIFT, this thus allowing a substantial reduction in the duration of the cycle of interrogation.

The signals of jump of fentre SHIFT and temporary inhibition MUTATED are preferably formed of one or more momentary interruptions of the electromagnetic field 1 transmitted by the unit of reading 20. For this purpose, the means of detection 314 associated logical of control 302 (figure 3a) of each transponder are used to supervise if such interruptions features of a signal of jump SHIFT or a MUTATED signal of inhibition are generated by the unit of reading 20.

It will be noted that in the embodiment described above in reference on figures 5 to 7, a signal of jump of fentre SHIFT is transmitted so as to indicate the passage to the fentre following answer. Each transponder counts the signals of jump of fentre SHIFT transmitted by the unit of reading until I' occurrence of the fentre of selected answer. 11 is thus possible to prolong so required the duration of a fentre of answer, for example so as to address a transponder as soon as this one to identified summer.

Alternatively, it is also proposed to fix one determined duration for each fentre of answer, this sufficient duration in front of tre to allow the transmission of a signal of answer. In such a case, a signal of jump of fentre is then required only in the cases of figure where the fentre of answer is not used or a collision is detected.

Moreover, the signal of jump of fentre SHIFT can tre thus interpreted by the transponders in activity so that they advance the emission of their corresponding signal of one duration response to the remaining duration of the fentre of answer.

It will be noted finally that certain applying does not require necessarily the identification of the totality of the questioned transponders.

Thus, for example, a system of remote opening for vehicle with which a unit with transponders is associated (or "

keys ") requires only the identification of the first transponder emitting its signal of response without collision, and this within the most short possible time. In the illustration of the figure 7a, this would result thus in fine cycle of interrogation on reception of the signal of answer REP3 emanating from transponder TR3.

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CLAIMS

1. Process of identification of a plurality of transponders (Tri) being in a volume of communication (2) defined by an electromagnetic field (1) emanating from an unit of reading (20), the process including/understanding the following steps:
a) emission of the aforesaid electromagnetic field (1) allowing the carrying in awakening of the aforesaid transponders (Tri) being in the aforementioned volume of communication (2);
b) emission by the aforementioned unit of reading (20) of a signal of interrogation (INT) allowing synchronization of the aforesaid transponders (Tri) and initializing the opening of a whole of fentres of answer (SLOTk, k=1 with N) intended for the reception of signals of answer (REFERENCE MARK) emanating of the aforesaid transponders (Tri), each one of the aforesaid transponders (TRj) including/understanding means to select a fentre answer, among the aforementioned whole of the fentres of answer (SLOTk, k=1 with N), lasting which this transponder emits its signal of answer then;
c) sequential monitoring of the fentres of answer (SLOTk, k=1 with N) in order to determine the receptions without collision of signals of answer (REPi);
d) emission of signals of inhibition (MUTATED) allowing the suspension, at least temporarily, of the activity of transponders whose the aforementioned respective signals of answer (REPj) are received without collision; and
e) repetition of the steps b) with D) until the signals of response of the aforesaid the plurality of transponders are detected without collision at the time of the step c),
this process of identification being characterized in that the aforementioned means to select a fentre answer include/understand means of random selection which, with each new signal of interrogation (INT), determine random manner a fentre of unspecified answer among the aforementioned whole of fentres of answer (SLOTk, k=1 with N).

2. Proceeded of identification according to claim 1, characterized in that the global time of transaction required to the identification of each one of the aforesaid transponders (Tri) is optimized by unused means of reduction in the duration of fentres of answer.

3. Process of identification according to the claim 1 or 2 in which
the aforementioned sequential monitoring of the fentres of answer (SLOTk, k=1 with N) is
envisaged to also detect a collision between several signals of response within unspecified a fentre of answer, characterized in that the global time of transaction required to the identification of each one of the aforesaid transponders (Tri) is optimized by means of reduction in the duration of fentres in which a collision between several signals of answer (REFERENCE MARK) is detected.

4. Proceeded of identification according to the claim 1,2 or 3, characterized in that the aforementioned means of random selection include/understand of the means (402) allowing the generation of a random clock signal (RND CLK) pendent duration of the carrying in awakening of the transponder, the means (404) allowing a cyclic incrementing, on the base of the aforesaid random clock signal (RND CLK), of a value representative of a fentre of answer, means (400,406) allowing the loading of this value representative of the fentre of answer selected during the emission of the aforesaid signal of interrogation (INT).

5. Proceeded of identification according to claim 4, characterized in that the frequency of the aforesaid signal clock random (RND CLK) is substantially higher than the frequency of a clock signal used for internal operation of the aforesaid transponders (TRj).

6. Process of identification of a plurality of transponders (Tri) being in a volume of communication (2) defined by an electromagnetic field (1) emanating from an unit of reading (20), the process including/understanding the following steps:
a) emission of the aforesaid electromagnetic field (1) allowing the carrying in awakening of the aforesaid transponders (Tri) being in the aforementioned volume of communication (2);
b) emission by the aforementioned unit of reading (20) of a signal of interrogation (INT) allowing synchronization of the aforesaid transponders (TRj) and initializing the opening of a whole of fentres of answer (SLOTk, k=1 with N) intended for the reception of signals of answer (REFERENCE MARK) emanating of the aforesaid transponders (Tri), each one of the aforesaid transponders (Tri) including/understanding means to select a fentre answer, among the aforementioned whole of the fentres of answer (SLOTk, k=1 with N), lasting which this transponder emits its signal of answer then;
c) sequential monitoring of the fentres of answer (SLOTk, k=1 with N)
in order to determine the states of occupation of them, especially a non-utilization or
a reception without collision of a signal of answer (REPi);
d) emission of a signal of inhibition (MUTATED) allowing the suspension, at least temporarily, of the activity of a

transponder whose the aforementioned signal of answer (REFERENCE MARK) is received without collision;
e) repetition of the steps b) with D) until the signals of response of the aforesaid the plurality of transponders are detected without collision at the time of the step c),
this process of identification being characterized in that the global time of transaction required to the identification of each one of the aforesaid transponders (Tri) is optimized by unused means of reduction in the duration of fentres of answer.

7. Proceeded of identification according to the claim 6 in which the aforementioned sequential monitoring of the fentres of answer (SLOTk, k=1 with N) is designed to also detect a collision between several signals of response within unspecified a fentre of answer, characterized in that the global time of transaction required to the identification of each one of the aforesaid transponders (Tri) moreover is optimized by means of reduction in the duration of fentres in which a collision between several signals of answer (REPi) is detected.

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8. Proceeded of identification according to any of claims 1 to 7, characterized in that the aforementioned signal of inhibition (MUTATED) is composed of one or more momentary interruptions of the aforesaid electromagnetic field (1).

9. Proceeded of identification according to any of claims 1 to 8, characterized in that the aforementioned signal of interrogation (INT) includes/understands moreover a code stock representative of a determined family of transponders, the aforementioned code stock allowing a preliminary sorting of all the transponders not belonging to the aforementioned family of transponders.

10. Unit of reading (20) allowing the identification of a plurality of transponders (Tri) being in a volume of communication (2) defined by an electromagnetic field (1) emanating of the aforesaid the unit of reading (20), the aforementioned unit of reading (20) including/understanding means of emission (Tx) connected to means of modulation (206), means of reception (X-ray) connected to means of demodulation (208), means of treatment and control (202) and means of storage (204), this unit of reading (20) being arranged for
a) to put in awakening the aforementioned transponders (Tri) by the emission of the aforesaid electromagnetic field (1);
b) to emit a signal of interrogation (INT) allowing synchronization of the aforesaid transponders (TRj) and initializing the opening of a whole of fentres of answer (SLOTk, k=1 with N) intended for the reception of signals of answer (REFERENCE MARK) emanating of the aforesaid transponders (Tri);
c) to sequentially scan each fentres of answer (SLOTk, k=1 with N) in order to determine the states of occupation of them, especially a nonutilisation or a reception without collision of a signal of answer (REPj);
d) to emit a signal of inhibition (MUTATED) allowing the suspension, at least temporarily, of the activity of a transponder whose the aforementioned signal of answer (REFERENCE MARK) is received without collision; and
e) to repeat the steps b) with D) until the signals of response of the aforesaid the plurality of transponders are detected without collision,
this unit of reading (20) being characterized in that this one moreover is arranged to emit a signal of reduction in the duration of any fentre of answer when no signal of answer (REPj) is received in this fentre of answer.

11. Unit of reading (20) according to claim 10, characterized in that this one moreover is arranged to emit a signal of reduction in the duration of a fentre of answer when a collision between several signals of answer (REFERENCE MARK) is detected in this fentre answer.

12. Transponder (TR) including/understanding means of communication (300,306), means of treatment and control (302), means of storage (304) and means answering the reception of a signal of interrogation (INT) emanating of an unit of reading (20) and allowing to select, a fentre answer, among a whole of fentres of answer (SLOTk, k=1 with N), lasting which this transponder emits a signal of answer (REFERENCE MARK), this transponder being arranged to suspend its activity, at least temporarily, on reception of a signal of inhibition (MUTATED), this transponder being characterized in what the aforementioned means to select a fentre answer include/understand means of random selection which, with each new signal of interrogation (INT), determines random manner a fentre of unspecified answer among the aforementioned whole of fentres of answer (SLOTk, k=1 with N).